

Appl. No. 10/815,561
Amdt. Dated January 19, 2006
Reply to Final Office action of January 4, 2006

REMARKS/ARGUMENTS

Claims 1-26 and 30-32 are pending in the present application.

This Amendment is in response to the Final Office Action mailed January 4, 2006. In the Office Action, the Examiner rejected claims 1-2, 5, 8-9, 11, 14, 17-18, 21-22, and 24 under 35 U.S.C. §102(c); and claims 3-4, 6-7, 10, 12-13, 15-16, 19-20, 23, 25-26, and 30-32 under 35 U.S.C. §103(a). Applicant has amended claims 1, 17, and 30 to clarify the claim language. Reconsideration in light of the amendments and remarks made herein is respectfully requested.

Response to Examiner's arguments

In the Final Office Action, the Examiner contends that "the exposure of the bond pad on the substrate by local flow of the polymer is realized because the polymer is not fully cured when the printing step takes place," citing Farnworth, col. 5, lines 1-28 (Final Office Action, page 4, paragraph number 7). Applicant respectfully disagrees for the following reasons.

First, the cited excerpt does not disclose that a local flow is realized because the polymer is not fully cured. The cited excerpt merely discloses that "the polymer layer 24 is in a semi cured or B-stage condition during the contact printing step such that imprinting of the complementary patterns 36 (FIG. 2E) is facilitated" (Farnworth, col. 5, lines 5-8. Emphasis added.). The other words, the state of the polymer layer 24 being in a semi cured or B-stage condition is only to facilitate the imprinting, not to cause a local flow.

Second, Farnsworth merely discloses using a vacuum tool 38 to push the stencil 26 into the polymer layer 24P (Farnworth, col. 5, lines 1-2). The mere pushing of the stencil 26 into the polymer layer 24P does not cause a local flow. In addition, Farnworth discloses that one or more mechanical rollers 44 can be rolled over the stencil 26 to push the features 30, 32, 34 into the polymer layer 24 (Farnworth, col. 5, lines 2-5). Since the rollers 44 are used to roll over the stencil 26, without more, an overall pressure is created to push the entire stencil into the polymer. This cannot create a local flow.

The Examiner further contends that the space that the stamp makes as it imprints the polymer is the recess or the convex over-all profile (Final Office Action, page 4, paragraph number 7). Applicant respectfully disagrees for the following reasons.

Appl. No. 10/815,561
Amdt. Dated January 19, 2006
Reply to Final Office action of January 4, 2006

First, the Examiner has not clearly identified which "space" that the stamp makes that is the convex over-all profile. The Examiner should set forth in the Office Action the relevant teachings of the prior art relied upon, preferably with reference to the relevant column or page number(s) and line number(s) where appropriate. See MPEP 706.02(j). The goal of examination is to clearly articulate any rejection early in the prosecution process so that the Applicant has the opportunity to provide evidence of a patentability and otherwise reply completely at the earliest opportunity. See MPEP 706. The Examiner repeated the rejection without taking note of the Applicant's arguments and without answering the substance of Applicant's arguments as presented in the previously filed response. The MPEP requires that the Examiner's action will be complete as to all matters. 37 CFR 1.104; MPEP 707.07. Since the Examiner's action in the Final Office Action is incomplete in that there is no answer to the substance of Applicant's arguments previously presented, the rejections have been improperly made.

Second, Farnworth merely discloses that the recessed features 50 are formed by the features 30 (FIG. 2D) on the stencil 26. Farnworth further discloses that the recessed features 50 can comprise openings, pockets, or grooves (Farnworth, col. 5, lines 12-15). Since there are openings, pockets, or grooves, they cannot form a convex over-all profile.

Rejection Under 35 U.S.C. § 102

In the Final Office Action, the Examiner rejected claims 1-2, 5, 8-9, 11, 14, 17-18, 21-22, and 24 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,897,089 issued to Farnworth ("Farnworth"). Applicant respectfully traverses the rejection and contends that the Examiner has not met the burden of establishing a prima facie case of anticipation.

Farnworth discloses a method and system for fabricating semiconductor components using wafer level contact printing. A die includes a pattern of die contacts 18 formed on a circuit side 20 (Farnworth, col. 3, lines 34-35). A polymer layer 24 is formed on the circuit side 20 of a substrate 14 (Farnworth, col. 3, lines 43-44). A stencil 26 is then provided which includes a plurality of patterns 28 (Farnworth, col. 4, lines 13-15). Each of the patterns 28 is adapted to imprint a complementary pattern 36 in the polymer layer 24, with each die 12 including at least one complementary pattern 36 (Farnworth, col. 4, lines 22-25). Then, an alignment step is performed in which the stencil 26 is aligned with the substrate 14 (Farnworth, col. 4, lines 35-

Appl. No. 10/815,561
Amdt. Dated January 19, 2006
Reply to Final Office action of January 4, 2006

37). Then, a contact printing step is performed in which the stencil 26 is placed in contact with the polymer layer 24 to form a patterned polymer layer 24P imprinted with the complementary patterns 36 (Farnworth, col. 4, lines 64-67). None of these steps includes exposing a bond pad on the substrate by local flow of the polymer.

Farnworth does not disclose, either expressly or inherently, at least forming an imprinted polymer disposed upon a substrate under one of a thermal load and a vibratory load to expose a bond pad on the substrate by local flow of the polymer, wherein a recess is formed in the polymer, as recited in amended independent claims 1, 17, and 30.

To anticipate a claim, the reference must teach every element of the claim. "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." Vergegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ 2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the...claim." Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 USPQ 2d 1913, 1920 (Fed. Cir. 1989). Since the Examiner failed to show that Farnworth teaches or discloses any one of the above elements, the rejection under 35 U.S.C. §102 is improper.

Farnworth merely discloses performing a contact printing step in which the stencil 26 is placed in contact with the polymer layer 24 to form a patterned polymer layer 24P imprinted with the complementary patterns 36 (Farnworth, col. 4, lines 64-67). A contact printing step is not the same as causing a local flow of the polymer. Applicant has amended claims 1, 17, and 30 to clarify this aspect of the invention.

Additionally, Farnworth does not disclose a convex over-all profile as recited in claims 5. As discussed above, Farnworth discloses that the recessed features 50 can comprise openings, pockets, or grooves (Farnworth, col. 5, lines 12-15). Since there are openings, pockets, or grooves, they cannot form a convex over-all profile.

Therefore, Applicant believes that independent claims 1 and 17 and their respective dependent claims are distinguishable over the cited prior art references. Accordingly, Applicant respectfully requests the rejection under 35 U.S.C. §102(e) be withdrawn.

Appl. No. 10/815,561
Amdt. Dated January 19, 2006
Reply to Final Office action of January 4, 2006

Rejection Under 35 U.S.C. § 103

In the Final Office Action, the Examiner rejected claims 3-4, 6-7, 10, 12-13, 15-16, 19-20, 23, 25-26, and 30-32 under 35 U.S.C. §103(a) as being unpatentable over Farnworth. Applicant respectfully traverses the rejection and contends that the Examiner has not met the burden of establishing a prima facie case of obviousness.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. *MPEP §2143, p. 2100-129 (8th Ed., Rev. 2, May 2004)*. Applicants respectfully contend that there is no suggestion or motivation to combine their teachings, and thus no *prima facie* case of obviousness has been established.

Farnworth discloses a method and system for fabricating semiconductor components using wafer level contact printing as discussed above

Farnworth, taken alone or in any combination, does not disclose, suggest, or render obvious (1) local flow of the polymer, (2) filling a solder flux into the recess, (3) a convex over-all profile, (4) attaching a microprocessor to the solder bump, and (5) partially flattening the convex over-all profile

The Examiner merely states that it would have been obvious to one of ordinary skill in the art to have had a microprocessor mated with the solder bump, wherein mating includes at least partially flattening the convex over-all profile, etc. (Final Office Action, page 4, paragraph number 6.). The Examiner apparently relied on the "official notice" to arrive at such a conclusion because the Examiner did not provide any prior art reference teaching or suggesting the above feature. Applicant contends that such an official notice is inappropriate.

Official notice unsupported by documenting evidence should only be taken by the Examiner where the facts asserted to be well-known, or to be common knowledge in the art are capable of instant and unquestionable demonstration as being well known. *In re Ahlert*, 424 F.2d 1088, 1091, 165 USPQ 418, 420 (CCPA 1970); MPEP 2144.03A. It would not be appropriate for the Examiner to take official notice of facts without citing a prior art references. MPEP

Appl. No. 10/815,561
Amdt. Dated January 19, 2006
Reply to Final Office action of January 4, 2006

2144.03A. Furthermore, if official notice is taken of a fact, unsupported by documentary evidence, the technical line of reasoning underlying a decision to take such notice must be clear and unmistakable. MPEP 2144.03B.

Here, Farnworth does not disclose or suggest local flow of the polymer and a convex over-all profile as discussed above. The Examiner did not provide a technical line of reasoning which must be clear and unmistakable. The Examiner merely states that "it would have been obvious to one of ordinary skill in the art . . . mating includes at least partially flattening the convex over-all profile. Farnworth merely discloses a contact printing step to place the stencil 26 in contact with the polymer layer 24. This operation is not related to causing a local flow in the polymer. In addition, it does not involve the use of a convex over-all profile. Therefore, the Examiner's reasoning is unclear and not unmistakable.

Furthermore, Farnworth discloses that the dice 12 are contained on a substrate 14 (Farnworth, col. 3, lines 24-25). The dice 12 can comprise a DRAM, a SRAM, a flash memory, a microprocessor, a DSP, or an ASIC (Farnworth, col. 3, lines 24-25). Each singulated component 10 includes a semiconductor die 12 and a portion of the patterned polymer layer 24P formed on the circuit side of the die 12 (Farnworth, col. 6, lines 61-63). Since the substrate 14 already contains the dice 12, it is not possible to attach another microprocessor to the solder bump.

The Examiner failed to establish a prima facie case of obviousness and failed to show there is teaching, suggestion or motivation to combine the references. When applying 35 U.S.C. 103, the following tenets of patent law must be adhered to: (A) The claimed invention must be considered as a whole; (B) The references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination; (C) The references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention; and (D) Reasonable expectation of success is the standard with which obviousness is determined. Hodosh v. Block Drug Co., Inc., 786 F.2d 1136, 1143 n.5, 229 USPQ 182, 187 n.5 (Fed. Cir. 1986). "When determining the patentability of a claimed invention which combined two known elements, 'the question is whether there is something in the prior art as a whole suggest the desirability, and thus the obviousness, of making the combination.'" In re Beattie, Lindemann Maschinfabrik GmbH v. American Hoist & Derrick Co., 730 F.2d 1452, 1462, 221 USPQ

Appl. No. 10/815,561
Amdt. Dated January 19, 2006
Reply to Final Office action of January 4, 2006

(BNA) 481, 488 (Fed. Cir. 1984). To defeat patentability based on obviousness, the suggestion to make the new product having the claimed characteristics must come from the prior art, not from the hindsight knowledge of the invention. Interconnect Planning Corp. v. Feil, 744 F.2d 1132, 1143, 227 USPQ (BNA) 543, 551 (Fed. Cir. 1985). To prevent the use of hindsight based on the invention to defeat patentability of the invention, this court requires the Examiner to show a motivation to combine the references that create the case of obviousness. In other words, the Examiner must show reasons that a skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the prior elements from the cited prior references for combination in the manner claimed. In re Rouffet, 149 F.3d 1350 (Fed. Cir. 1996), 47 USPQ 2d (BNA) 1453. "To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or implicitly suggest the claimed invention or the Examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references." Ex parte Clapp, 227 USPQ 972, 973. (Bd.Pat.App.&Inter. 1985). The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. In re Mills, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). Furthermore, although a prior art device "may be capable of being modified to run the way the apparatus is claimed, there must be a suggestion or motivation in the reference to do so." In re Mills 916 F.2d at 682, 16 USPQ2d at 1432; In re Fitch, 972 F.2d 1260, 23 USPQ2d 1780 (Fed. Cir. 1992).

In the present invention, the cited references do not expressly or implicitly suggest any one of the above elements. In addition, the Examiner failed to present a convincing line of reasoning as to why a combination of Farnworth and any other information is an obvious application of embossing processes for substrate imprinting to reduce the particulates.

In summary, Applicant believes that independent claims 1, 17, and 30 and their respective dependent claims are distinguishable over the cited prior art references. Accordingly, Applicant respectfully requests the rejections under 35 U.S.C. §103(a) be withdrawn.

Appl. No. 10/815,561
Amdt. Dated January 19, 2006
Reply to Final Office action of January 4, 2006

Conclusion

Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

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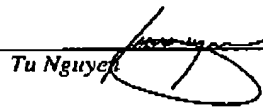
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